PMU Panel Mount Power Supply with Integrated DC-UPS

PMU-155W Series / PMU-☐V155W☐☐A

PMU

Highlights & Features

- LED indicators for DC OK (Green) and Battery Reverse Polarity Connection (Red)
- Zero cut-over time from loss of AC, to battery operation
- Protection against reverse polarity battery connection
- Conforms to harmonic current IEC/EN 61000-3-2, Class A
- High MTBF > 700,000 hrs. per Telcordia SR-332
- Monitoring Signals for AC OK, DC OK and Battery Low indication
- Overvoltage / Overcurrent / Over temperature / Short circuit protections
- Built-in over current and short circuit protection in Buffering (battery discharging) mode operation

Safety Standards

CB Certified for worldwide use

Model Number:	PMU-☐V155W☐☐A
Unit Weight:	0.60 kg (1.32 lb) (Enclosed) 0.54 kg (1.19 lb) (L Frame)
Dimensions (L x W x D):	178 x 97 x 38 mm (Enclosed) (7.01 x 3.82 x 1.50 inch) 178 x 96.5 x 37.5 mm (L Frame) (7.01 x 3.80 x 1.48 inch)

General Description

This PMU panel mount power supply, with integrated DC UPS function, prevents end-product downtime for the customer in the event of failure/disruption or unexpected loss of input AC power. The power supply will switch to battery operation (batteries not included) without interruption to increase the operational reliability of the critical mission. The TTL compatible monitoring signals for AC OK, DC OK and Battery Low will alert the user in the event of a failure. This convection-cooled single phase power supply has a wide operating temperature range from -20˚C to + 70˚C and is suitable for security system, access control, automatic doors, alarm system, and other similar products. In addition to having overvoltage, overload, over temperature, deep battery discharge, and reverse battery polarity protections on the main output, there are also short circuit and overload protections when operating in the buffering (battery discharging) mode. The PMU design meets worldwide safety approvals, certified to Class B radiated and conducted emission requirements, and is also available in an L Frame platform for different application needs.

Model Information

PMU Panel Mount Power Supply

Model Number	Input Voltage Range	Rated Output Voltage	Rated Output Current
PMU-13V155WC☐A	90-132Vac, 180-264Vac (Selectable by Switch)	13.8Vdc	V1: 9.5A, B+: 1.5A
PMU-13V155WL☐A			
PMU-27V155WC☐A		27.6Vdc	V1: 4.0A, B+: 1.5A
PMU-27V155WL☐A			V1: 4.3A, B+: 1.2A

Model Numbering

PM	U –	☐V	155W	☐	☐	A
Panel Mount	**Product Series**	**Output Voltage**	**Output Power**	**Package Type**	**Signal**	**Connector Type**
	U – With DC UPS function	13V 27V	(155W series)	C – Enclosed L – L Frame	B – Without Signal C – With Signal	A – Terminal Block

All parameters are specified at 25°C ambient and AC input unless otherwise indicated.

PMU Panel Mount Power Supply with Integrated DC-UPS

PMU-155W Series / PMU-☐V155W☐☐A

Specifications

Model Number	PMU-13V155W☐☐A		PMU-27V155W☐☐A	
	V1	B+	V1	B+

Input Ratings / Characteristics

Nominal Input Voltage		100-120Vac, 200-240Vac (Selectable by Switch)		
Input Voltage Range		90-132Vac, 180-264Vac (Selectable by Switch) For power de-rating at 90-132Vac, see power de-rating on page 5.		
Nominal Input Frequency		50-60Hz		
Input Frequency Range		47-63Hz		
Input Current		< 2.5A @ 115Vac, < 1.5A @ 230Vac		
Efficiency at 100% Load		> 85.0% @ 115Vac > 86.0% @ 230Vac	> 88.0% @ 115Vac > 89.0% @ 230Vac	
Max Power Dissipation	No Load	< 0.4W @ 115Vac < 0.5W @ 230Vac	< 0.6W @ 115Vac < 0.7W @ 230Vac	
	100% Load	< 23W @ 115Vac & 230Vac	< 19W @ 115Vac & 230Vac	
Max Inrush Current (Cold Start)		< 25A @ 115Vac & 230Vac		
Leakage Current		< 0.5mA @ 264Vac		

Output Ratings / Characteristics[1)]

Nominal Output Voltage			13.8Vdc	13.3Vdc[2)]	27.6Vdc	27.1Vdc[2)]
Factory Set Point Tolerance			± 2%			
Output Voltage Adjustment Range			12-14Vdc	-	24-28Vdc	-
Output Current[3)]	Enclosed	Normal Mode	9.5A (0-11A)	1.5A (0.5-1.5A)	4.0A (0-5.5A)	1.5A (0.5-1.5A)
		Buffering Mode	-	11A	-	5.5A
	L Frame	Normal Mode	9.5A (0-11A)	1.5A (0.5-1.5A)	4.3A (0-5.5A)	1.2A (0.5-1.2A)
		Buffering Mode	-	11A	-	5.5A
Output Power			151W (max)			
Line Regulation		V1	< 0.5% (90-132Vac @ 90% load,180-264Vac @ 100% load)			
Load Regulation		V1	< 1.0% (90-132Vac @ 0-90% load,180-264Vac @ 0-100% load)			
PARD[4)] (20MHz)		V1	< 150mVpp @ 0°C to -20°C < 100mVpp @ > 0°C to 70°C			
Rise Time		V1	< 50ms (100Vac @ 90% load, 200Vac @ 100% load)			
Start-up Time		V1	< 1,000ms (115Vac @ 90% load, 230Vac @ 100% load)			
Hold-up Time		V1	> 20ms (115Vac @ 90% load, 230Vac @ 100% load)			
Dynamic Response (Overshoot & Undershoot O/P Voltage)		V1	± 5%, 0-50% & 50-100% & 10-100% load (Slew Rate: 0.1A/μS, 50% duty cycle @ 5Hz to 1KHz)			
Start-up with Capacitive Loads		V1	3,600μF at 13.8V/11A		3,600μF at 27.6V/5.5A	
Voltage Drop Between V1 and B+		Normal Mode	0.5V typ.			
		Buffering Mode	0.2V typ.			
Series Operation			No			
Parallel Operation			No			

1) For power de-rating from < 0°C to -20°C, and 50°C to 70°C, and power de-rating at input voltage, see power de-rating on page 11.
2) If a battery is not connected to B+ and B-, when PMU is turned on, a voltage cannot be seen at these terminals.
3) The maximum combined output power from V1 and B+ is 151W at 180-264Vac input but the output power is reduced to 136W at 90-132Vac input
For example;
151W; V1: 27.6V/4A (110.4W), B+: 27.1V/1.5A (40.6) or V1: 27.6V/5.5A (151W), B+: 27.1V/0A (0W).
136W; V1: 27.6V/3.45A (95.2W), B+: 27.1V/1.5A (40.6) or V1: 27.6V/4.9A (136W), B+: 27.1V/0A (0W).
Battery charging current at B+ output can be adjusted according to output current range in parentheses by battery charging current adjustment potentiometer.
Load range in parentheses and rated current outside parentheses.
4) PARD is measured with an AC coupling mode, 5cm wires, and in parallel with 0.1μF ceramic capacitor & 47μF electrolytic capacitor.

PMU Panel Mount Power Supply with Integrated DC-UPS

PMU-155W Series / PMU-☐V155W☐☐A

Model Number		PMU-13V155W☐☐A		PMU-27V155W☐☐A	
		V1	B+	V1	B+

Battery Input / Output Characteristics

Nominal Battery Voltage (Batteries not included with power supply)		12Vdc SLA Sealed lead acid battery	24Vdc SLA Sealed lead acid battery 2 x 12Vdc SLA Sealed lead acid battery
Battery Voltage Range	Continuously Operating	11.0 to 13.8Vdc (nominal at 12V)	22.0 to 27.6Vdc (nominal at 24V)
	Maximum Allowed Voltage	16Vdc Max	32Vdc Max
	Minimum Voltage[1)]	8.5Vdc	16.5Vdc
Battery Capacity		3.3AH/ 7AH/ 12AH/ 15AH	
Charging Time[2)]		2-10 hrs @ charging current of 1.5A	
Recommended External Fuse for Battery		**PMU-13V155W☐☐A** Automotive 30A / 80V FK3 type from Littelfuse, or similar, in the battery B+ path. The battery fuse protects the wires between the battery and the unit. **PMU-27V155W☐☐A** Automotive 30A / 80V FK3 type from Littelfuse, or similar, in the battery B+ path. The battery fuse protects the wires between the battery and the unit.	
Battery Charging (Normal Mode)		CC-CV mode (constant current-constant voltage) at 0 to 1.5A	
End-of-Charge Voltage		The unit always charges battery to a fixed voltage value	

Mechanical

Case Chassis / Cover		AL / SGCC
Dimensions (L x W x D)	Enclosed	178 x 97 x 38 mm (7.01 x 3.82 x 1.50 inch)
	L Frame	178 x 96.5 x 37.5 mm (7.01 x 3.80 x 1.48 inch)
Unit Weight	Enclosed	0.60 kg (1.32 lb)
	L Frame	0.54 kg (1.19 lb)
LED Indicator	Green LED	DC OK
	Red LED	Battery Connected in Reverse Polarity
Cooling System		Convection
Terminal		M3.5 x 7 Pins (Rated 300V/15A)
Signal		JST: XHP-4 (PMU-☐V155W☐CA)
Wire		AWG 16-14
Noise (1 Meter from power supply)		Sound Pressure Level (SPL) < 30dBA

1) Minimum battery voltage required for power supply to detect battery in order to begin charging. Battery must be connected to power supply, with the correct polarity, across B+ and B- terminals; and, with input and output loads disconnected.
2) Charging time depends on the state/condition of battery discharge; and will depend on the amount of buffering/discharging time, and load current that battery was discharged at.

PMU Panel Mount Power Supply with Integrated DC-UPS

PMU-155W Series / PMU-☐V155W☐☐A

Buffering Times VS Output Load and Battery Capacity

PMU-13V155W☐☐A

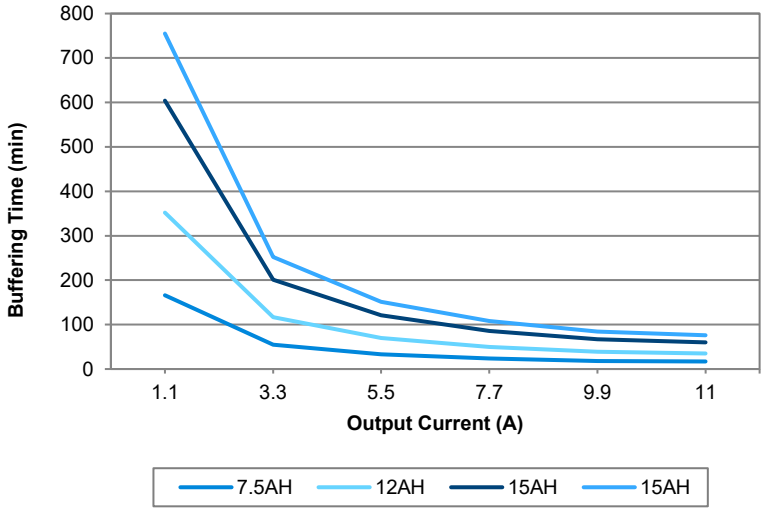


Fig. 1 Buffering Time VS Output Current (PMU-13V155W☐☐A)

Output Current	Buffering Time			
	3.3AH	7AH	12AH	15AH
1.1A	166m	352m	604m	755m
3.3A	55m	117m	201m	252m
5.5A	33m	70m	121m	151m
7.7A	24m	50m	86m	108m
9.9A	18m	39m	67m	84m
11.0A	17m	35m	60m	76m

These buffering times assume the battery is fully charged to begin with

PMU-27V155W☐☐A

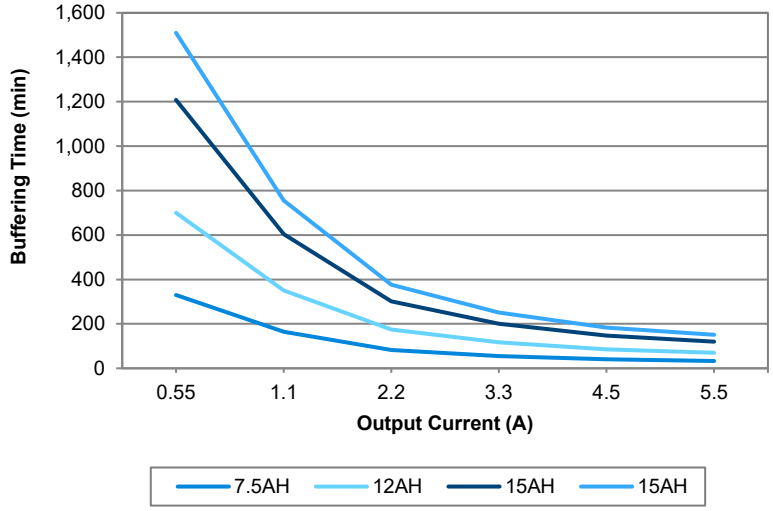


Fig. 2 Buffering Time VS Output Current (PMU-27V155W☐☐A)

Output Current	Buffering Time			
	3.3AH	7AH	12AH	15AH
0.55A	330m	700m	1208m	1510m
1.1A	165m	350m	604m	755m
2.2A	82m	175m	302m	377m
3.3A	55m	117m	201m	251m
4.5A	40m	85m	147m	184m
5.5A	33m	70m	120m	151m

These buffering times assume the battery is fully charged to begin with

PMU Panel Mount Power Supply with Integrated DC-UPS

PMU-155W Series / PMU-☐V155W☐☐A

Model Number	PMU-13V155W☐☐A		PMU-27V155W☐☐A	
	V1	B+	V1	B+

Environment

Surrounding Air Temperature	Operating	-20°C to +70°C
	Storage	-40°C to +85°C
Power De-rating	I/P: 90-132Vac	< 0°C to -20°C de-rate power by 2.25% / °C 50°C to 70°C de-rate power by 2.25% / °C
	I/P: 180-264Vac	< 0°C to -20°C de-rate power by 2.5% / °C 50°C to 70°C de-rate power by 2.5% / °C
Operating Humidity		5 to 95% RH (Non-Condensing)
Operating Altitude		0 to 5,000 Meters (16,400 ft.)
Shock Test (Non-Operating)		IEC 60068-2-27, 30G (300m/S²) for a duration of 18ms,3 times per direction, 9 times in total
Vibration (Non-Operating)		IEC 60068-2-6, 10Hz to 150Hz @ 50m/S² (5G peak); displacement of 0.35mm; 20 min per axis for all X, Y, Z direction
Bump (Operating)		IEC 60068-2-29, 10G (100m/S²) for a duration of 11ms,1000 times per direction, 3000 times in total
Over Voltage Category		II
Pollution Degree		2

Protections

Overvoltage	V1	<18.5V, SELV Output, Hiccup mode, Non-latching (auto-recovery)	<37.0V, SELV Output, Hiccup mode, Non-latching (auto-recovery)
	B+	15Vdc Max will not cause damage to the unit	30Vdc Max will not cause damage to the unit
Overload / Overcurrent	Normal Mode	105-150% of rated load current, Hiccup mode, Non-Latching (Auto recovery)	
	Buffering Mode	11.5-19.0A, Latch mode	6.05-11.0A, Latch mode
Over Temperature		Latch mode	
Short Circuit	Normal Mode	Hiccup Mode, Non-Latching (Auto-recovery when the fault is removed)	
	Buffering Mode	Latch mode	
Battery Polarity Protection		Yes (RED LED = ON)	Yes (RED LED = ON)[1)]
Wrong Battery Voltage Protection		Yes, 15Vdc Max will not cause damage to the unit	Yes, 30Vdc Max will not cause damage to the unit
Deep Discharge Protection[2)]		9.0V ± 0.5V	18.0V ± 0.5V
Internal fuse		T4AH	
Protection Against Shock		Class I with PE[3)] connection	

1) If the RED LED is ON, this indicates a failure in the installation of the battery. In this case, do not turn on the power supply (for 27V only) while the battery is connected. **POWER SUPPLY WILL BE DAMAGED!**
2) The unit will stop operating when the battery voltage detected is less than specified values.
3) PE: Primary Earth

PMU Panel Mount Power Supply with Integrated DC-UPS

PMU-155W Series / PMU-☐V155W☐☐A

Model Number	PMU-13V155W☐☐A		PMU-27V155W☐☐A	
	V1	B+	V1	B+

Reliability Data

MTBF	> 700,000 hrs. as per Telcordia SR-332 I/P: 115Vac, Ta: 25°C O/P: 13.8V/9.9A for 13V model and 27.6V/4.95A for 27V model
Expected Cap Life Time	10 years (115Vac & 230Vac, 50% load @ 40°C)

Safety Standards / Directives

Safety Entry Low Voltage		SELV (EN 60950-1)
Electrical Safety	SIQ Bauart UL/cUL recognized CCC CB scheme	EN 60950-1 UL 60950-1 and CSA C22.2 No. 60950-1 (File No. E191395) GB4943.1 IEC 60950-1
CE		In conformance with EMC Directive 2014/30/EU and Low Voltage Directive 2014/35/EU
Material and Parts		RoHS Directive (2011/65/EU)
Galvanic Isolation	Input to Output	3.0KVac
	Input to Ground	1.5KVac
	Output to Ground	0.5KVac

PMU Panel Mount Power Supply with Integrated DC-UPS

PMU-155W Series / PMU-☐V155W☐☐A

Model Number		PMU-13V155W☐☐A		PMU-27V155W☐☐A	
		V1	B+	V1	B+

EMC

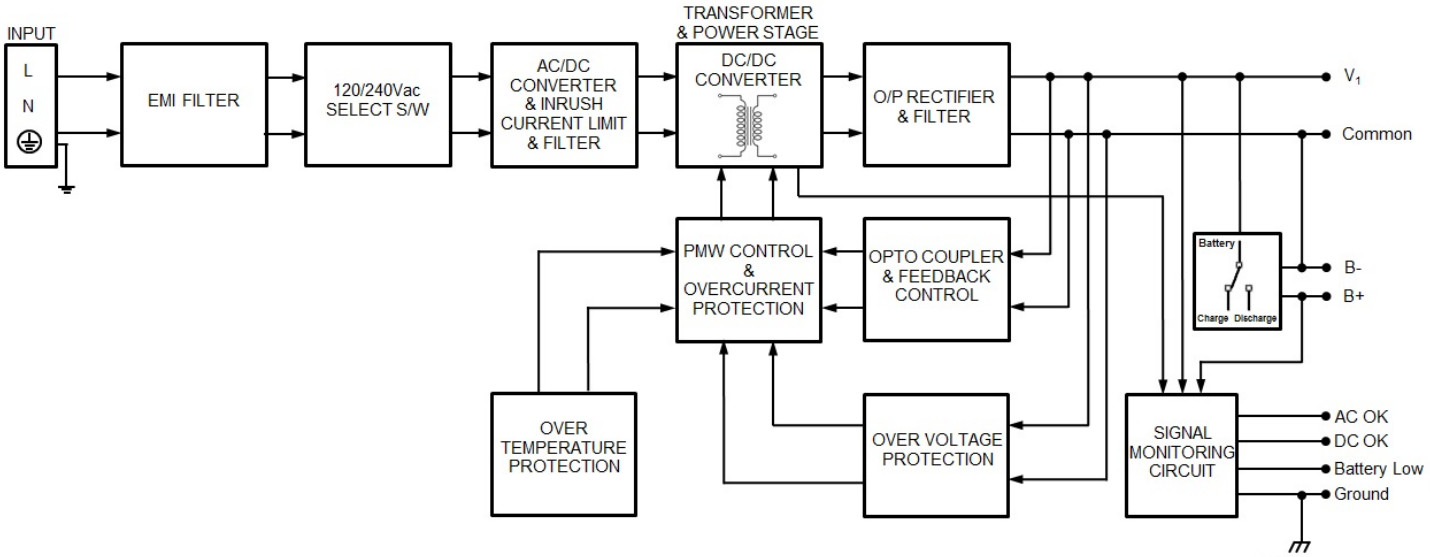
Emissions (CE & RE)		CISPR 22, CISPR 32, EN 55022, EN 55032, FCC Title 47: Class B GB9254.1	
Immunity		EN 55024	
Electrostatic Discharge	IEC 61000-4-2	Level 3 Criteria A[1)] Air Discharge: 8kV Contact Discharge: 6kV	
Radiated Field	IEC 61000-4-3	Level 3 Criteria A[1)] 80MHz-1GHz, 10V/M with 1kHz tone / 80% modulation	
Electrical Fast Transient / Burst	IEC 61000-4-4	Level 3 Criteria A[1)] 2kV (Input power ports)	
Surge	IEC 61000-4-5	Level 3 Criteria A[1)] Common Mode[2)]: 2kV Differential Mode[3)]: 1kV	
Conducted	IEC 61000-4-6	Level 3 Criteria A[1)] 150kHz-80MHz, 10Vrms	
Power Frequency Magnetic Fields	IEC 61000-4-8	Criteria A[1)] 10A/Meter	
Voltage Dips and Interruptions	IEC 61000-4-11	0% of 100Vac, 20ms 70% of 100Vac, 500ms 0% of 100Vac, 5000ms 0% of 240Vac, 20ms 70% of 240Vac, 500ms 0% of 240Vac, 5000ms	Criteria A[1)] Criteria A[1)] Criteria B[2)] Criteria A[1)] Criteria A[1)] Criteria B[2)]
Low Energy Pulse Test (Ring Wave)	IEC 61000-4-12	Level 3 Criteria A[1)] Common Mode[2)]: 2kV Differential Mode[3)]: 1kV	
Harmonic Current Emission		IEC/EN 61000-3-2, Class A, GB17625.1	
Voltage Fluctuation and Flicker		IEC/EN 61000-3-3	

1) Criteria A: Normal performance within the specification limits
2) Asymmetrical: Common mode (Line to earth)
3) Symmetrical: Differential mode (Line to line)

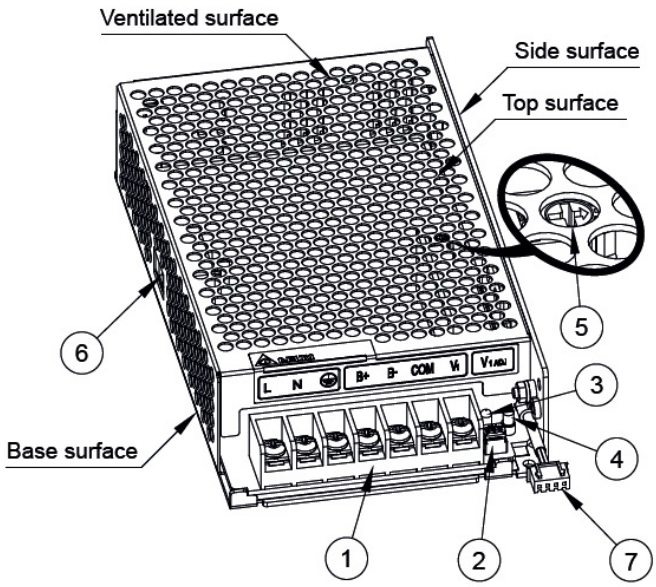
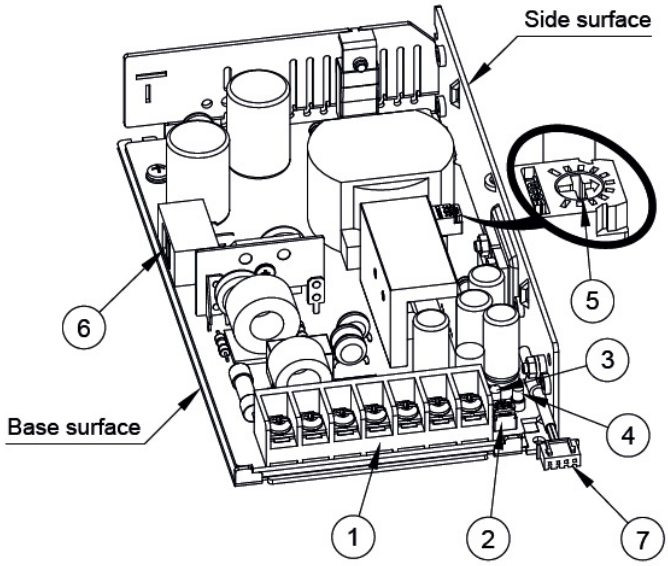
PMU Panel Mount Power Supply with Integrated DC-UPS

PMU-155W Series / PMU-☐V155W☐☐A

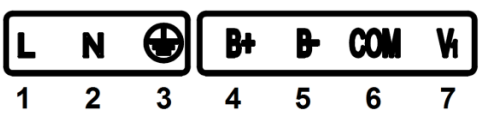
Block Diagram



Device Descriptions

PMU-☐V155WC☐A (Enclosed)	PMU-☐V155WL☐A (L Frame)
	

1) Input & Output terminal block connector
2) DC voltage adjustment potentiometer (12V - 14V, 24V - 28V)
3) DC OK LED (Green)
4) Battery reverse polarity LED (Red)
5) Battery charging current adjustment potentiometer
6) AC line voltage selector switch
7) Signal connector (for PMU-☐V155W☐CA)



Pin No. 1 2 3 4 5 6 7

Pin No.	Device Description	Pin No.	Device Description
1	Line	4	Battery +
2	Neutral	5	Battery -
3	FG	6	Common (-)
		7	V1 (+)

All parameters are specified at 25°C ambient and AC input unless otherwise indicated.
www.DeltaPSU.com (November 2018, Rev.02)

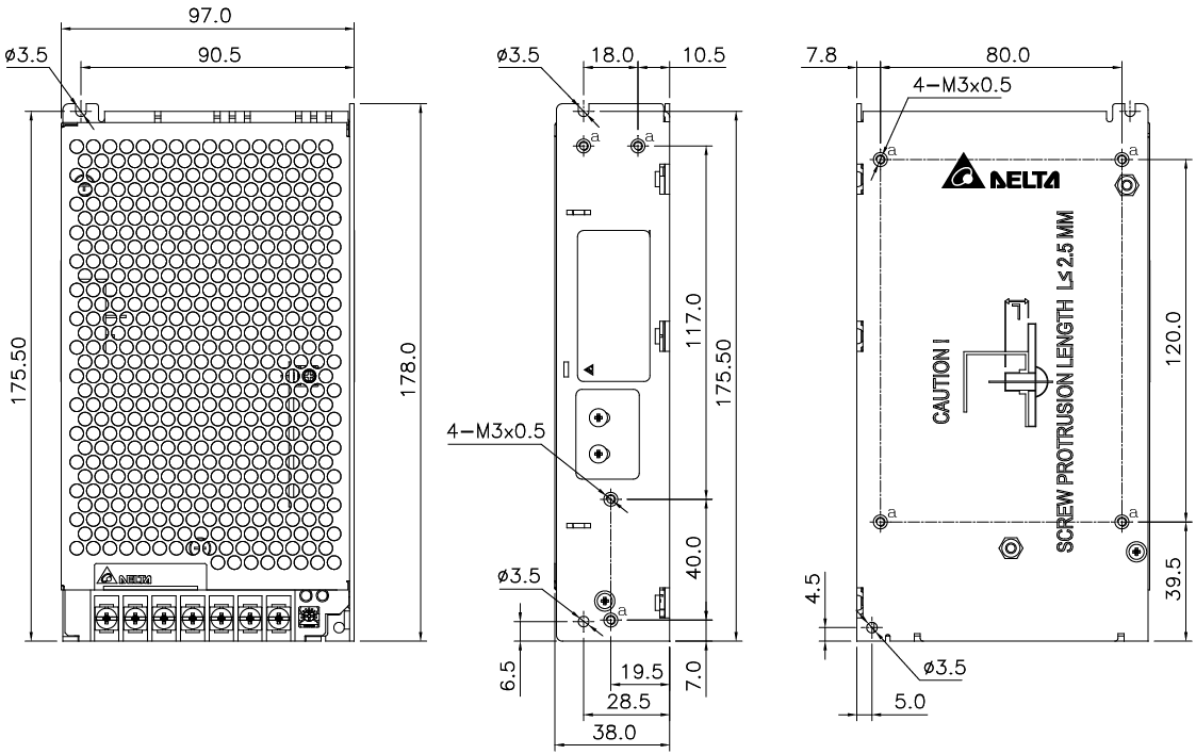
PMU Panel Mount Power Supply with Integrated DC-UPS

PMU-155W Series / PMU-☐V155W☐☐A

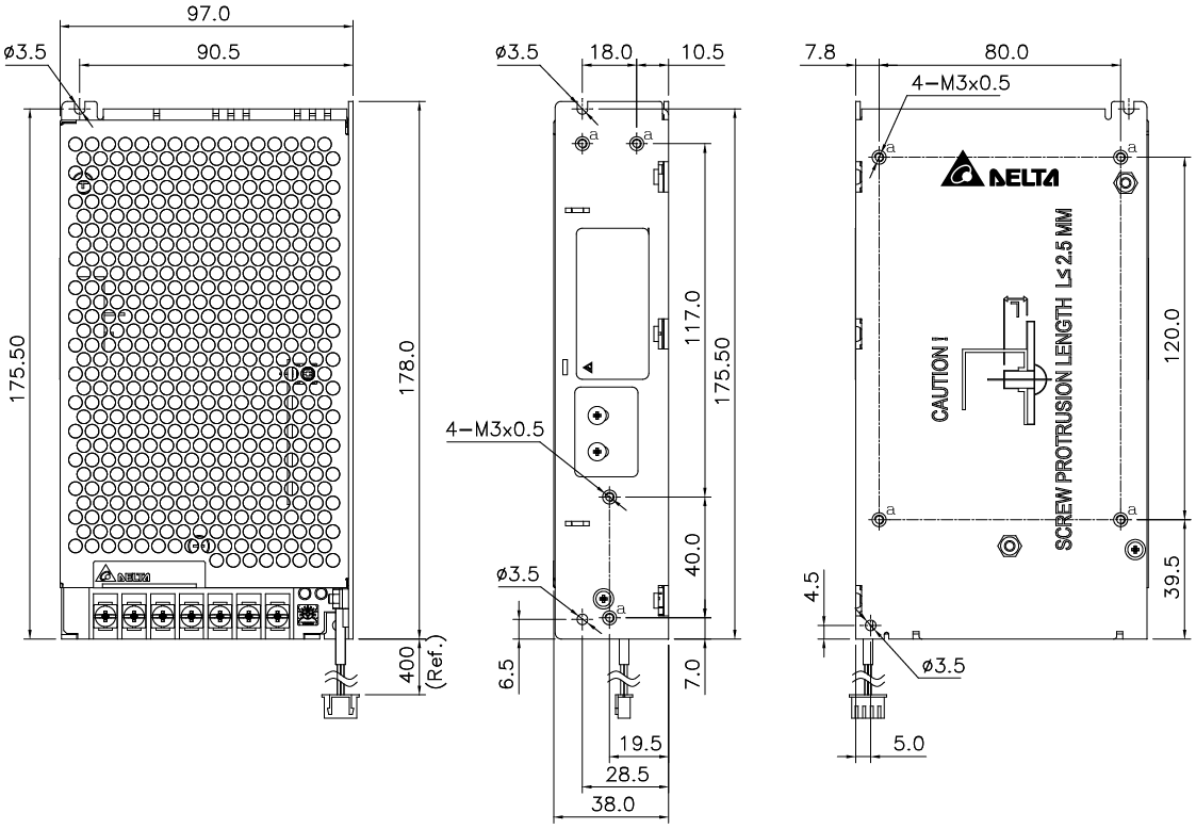
Dimensions

L x W x D: 178 x 97 x 38 mm (7.01 x 3.82 x 1.50 inch)

PMU-☐V155WCBA



PMU-☐V155WCCA



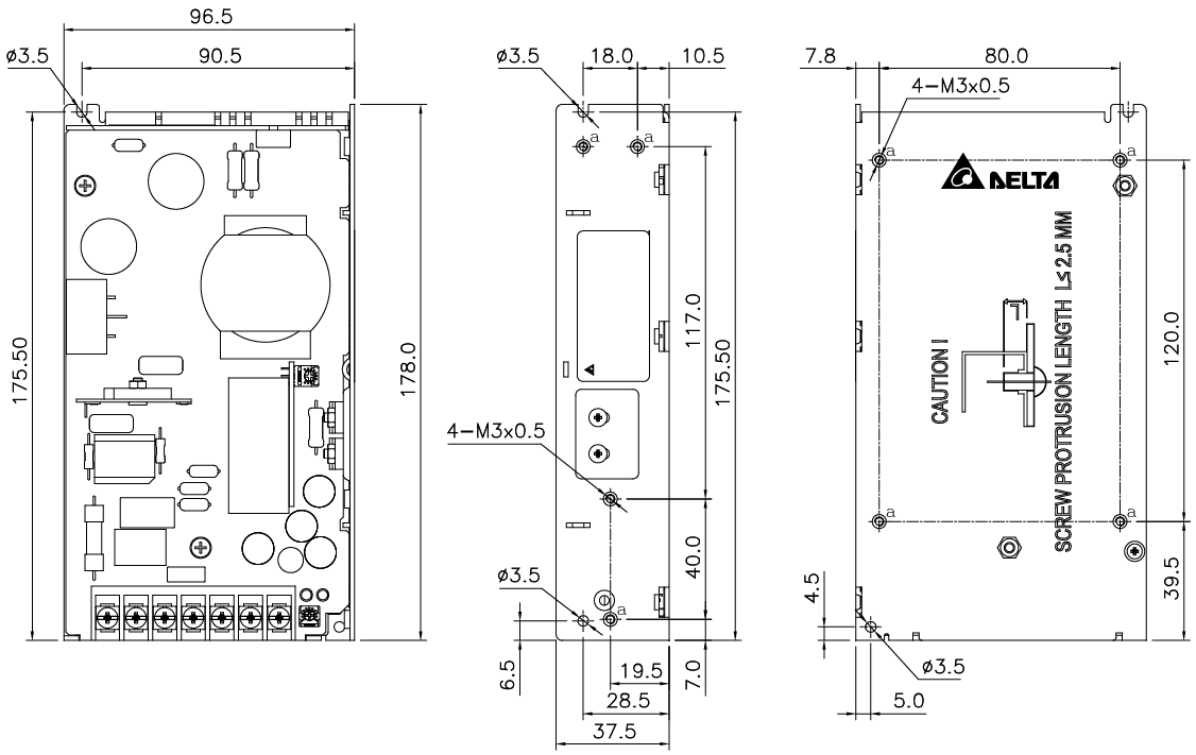
All parameters are specified at 25°C ambient and AC input unless otherwise indicated.

PMU Panel Mount Power Supply with Integrated DC-UPS

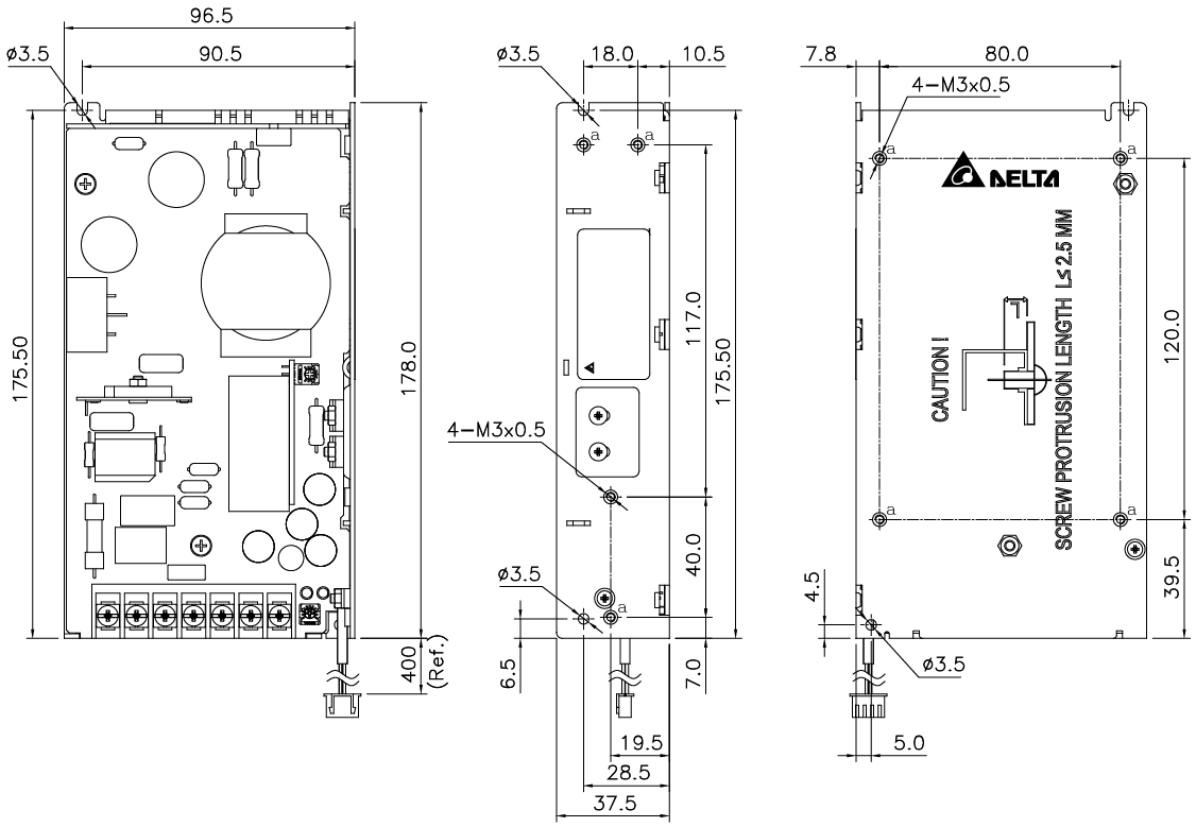
PMU-155W Series / PMU-☐V155W☐☐A

L x W x D: 178 x 96.5 x 37.5 mm (7.01 x 3.80 x 1.48 inch)

PMU-☐V155WLBA



PMU-☐V155WLCA



PMU Panel Mount Power Supply with Integrated DC-UPS

PMU-155W Series / PMU-☐V155W☐☐A

Engineering Data

Output Load De-rating VS Surrounding Air Temperature

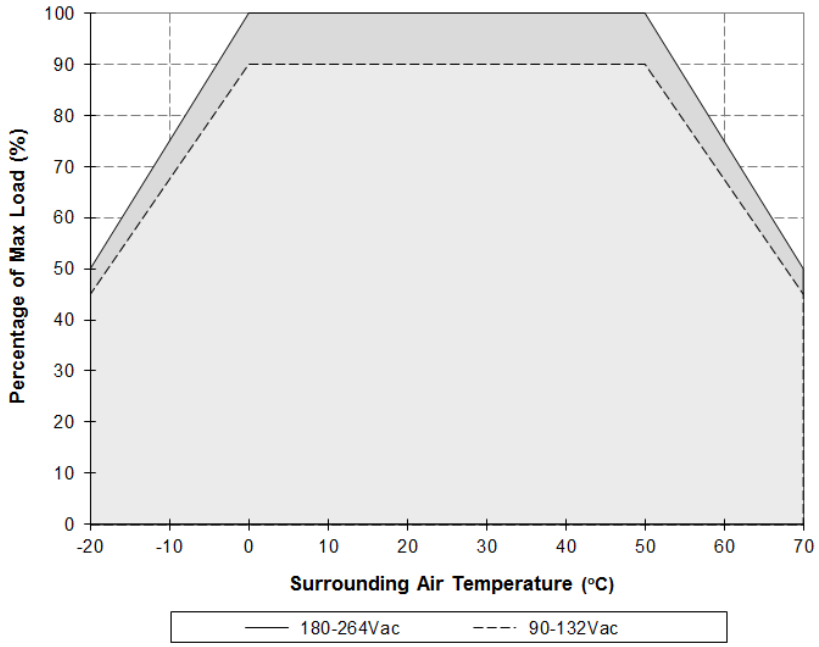


Fig. 3 De-rating for Vertical and Horizontal Mounting Orientation

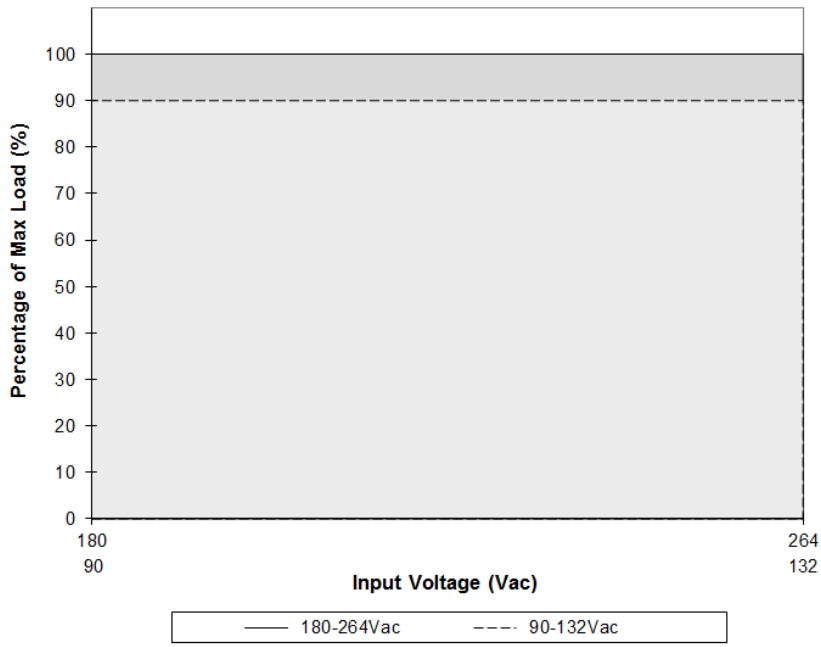
90-132Vac 0°C to -20°C de-rate power by 2.25% / °C
> 50°C de-rate power by 2.25% / °C

180-264Vac 0°C to -20°C de-rate power by 2.5% / °C
> 50°C de-rate power by 2.5% / °C

Note

1. Power supply components may degrade, or be damaged, when the power supply is continuously used outside the shaded region, refer to the graph shown in Fig. 3.
2. If the output capacity is not reduced when surrounding air temperature >50°C, the device will run into Over Temperature Protection. When activated, the output voltage will go into bouncing mode and will recover when the surrounding air temperature is lowered or the load is reduced as far as necessary to keep the device in working condition.
3. In order for the device to function in the manner intended, it is also necessary to keep a safety distance of 20mm (0.78 inch) from adjacent units while the device is in operation.
4. Depending on the surrounding air temperature and output load delivered by the power supply, the device can be very hot!
5. If the device has to be mounted in any other orientation, please contact **info@deltapsu.com** for more details.

Output Load De-rating VS Input Voltage



- No output power de-rating across the entire input voltage range

PMU Panel Mount Power Supply with Integrated DC-UPS

PMU-155W Series / PMU-☐V155W☐☐A

Assembly & Installation

Ⓐ Mounting holes for power supply assembly onto the mounting surface.
The power supply shall be mounted on minimum 2 mounting holes using M3 screw minimum 5mm length.
Ⓑ This surface belongs to customer's end system or panel where the power supply is mounted.
Ⓒ Connector

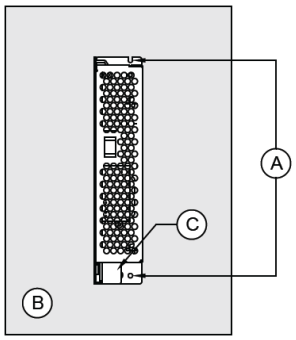
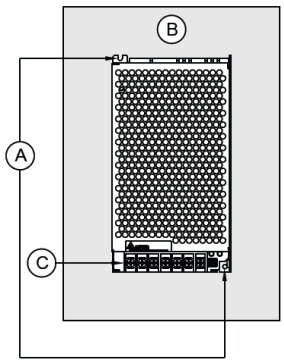
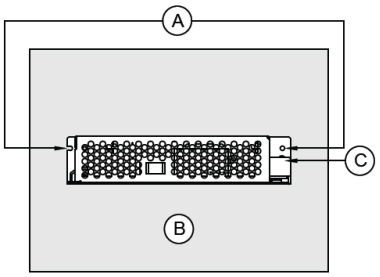
Side Mounting (Vertical)	Base Mounting (Vertical)	Side Mounting (Horizontal)
		

Fig. 4 Mounting Orientation

- Use flexible cable (stranded or solid), AWG No. 16-14.
- Please refer to Table 1 for the recommended Monitoring Signal Mating Connector of PMU-☐V155W☐CA.

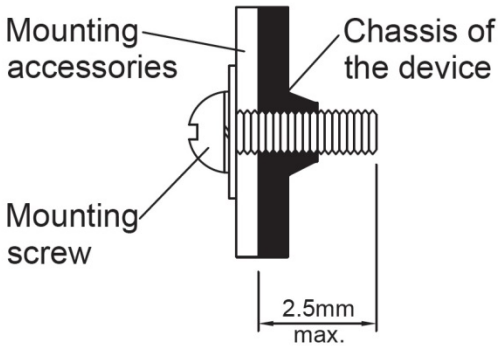
Table 1	Monitoring Signal	Recommended Header	Signal Connector	Terminal
JST connector	Monitoring Signal	XH	XHP-4	SXH-001T-P0.6

- The torque at the Connector shall not exceed 13 Kgf.cm (11.23 lbf.in). The insulation stripping length should not exceed 0.275" or 7 mm.

PMU Panel Mount Power Supply with Integrated DC-UPS

PMU-155W Series / PMU-☐V155W☐☐A

Installation of Mounting Accessories

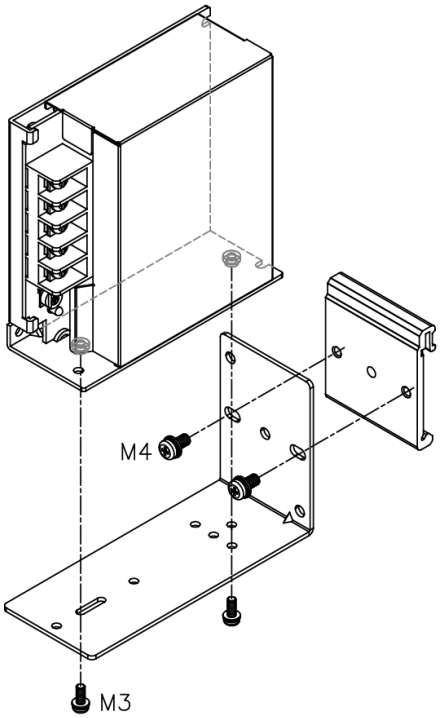


- Only use M3 screw ≤ 2.5mm (0.09 inch) through the base mounting holes. This is to keep a safety distance between the screw and internal components.
- Recommended mounting tightening torque: 4~8 Kgf.cm (3.47~6.94 lbf.in).

Safety Instructions

- Must select correct AC input voltage range through selectable switch before turning on
- To ensure sufficient convection cooling, always maintain a safety distance of ≥ 20mm (0.78 inch) from all ventilated surfaces while the device is in operation.
- The device is not recommended to be placed on low thermal conductive surface, such as plastics, for example, plastics.
- Note that the enclosure of the device can become very hot depending on the ambient temperature and load of the power supply. Do not touch the device while it is in operation or immediately after power is turned OFF. Risk of burning!
- Do not touch the terminals while power is being supplied. Risk of electric shock.
- Prevent any foreign metal, particles or conductors from entering the device through the openings during installation. It may cause: Electric shock; Safety Hazard; Fire; Product failure
- Battery need to be protected from short circuit while installation & servicing. Danger of explosion.
- Signal cable should not interact with AC Input.
- Connecting the battery to device before connecting mains input (L, N and PE). If the Red LED is on, this indicates a failure in the installation. In this case, do not turn on power supply (for 27V only) while the battery is connected. **POWER SUPPLY WILL BE DAMAGED**!
- Warning: When connecting the device, secure Earth connection before connecting L and N. When disconnecting the device, remove L and N connections before removing the Earth connection.

Accessories



L-02: Latch
P-03: Bracket

These accessories are used to mount the panel mount power supply onto a DIN rail.

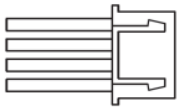
PMU Panel Mount Power Supply with Integrated DC-UPS

PMU-155W Series / PMU-☐V155W☐☐A

Functions

Monitoring Signal Characteristics

The power supply is equipped with monitoring signal outputs for PMU-☐V155W☐CA to remote monitoring of the unit.



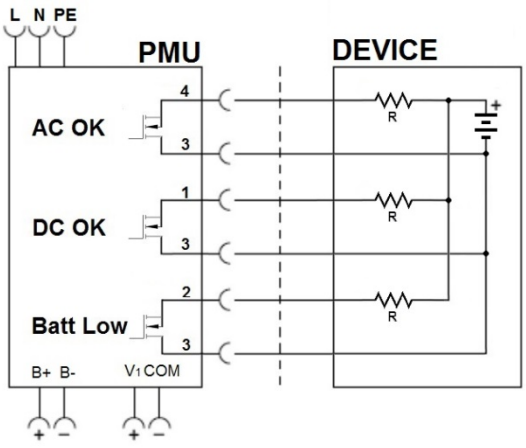
Pin No.	Description
1	DC OK
2	Low Battery
3	GND
4	AC OK

(1) AC OK, DC OK and Battery Low monitoring signal outputs are TTL open collector. Must be connected through a pull up resistor to V1 output, or another voltage source.
(2) The applied voltage should be in the range of 5V to 48V with sink current of 2mA to 30mA.
(3) The table below provides the characteristics of monitoring signal functions.

Function	Description	Monitoring Signal status
AC OK	This signal is active Low when power supply is operating from AC input.	Low[1)]
	This signal changes to active High level when AC input voltage collapses	High[2)]
DC OK	This signal is active Low when power supply is operating within specified input operating line voltage range, or specified battery operating voltage range.	Low[1)]
	This signal changes to active High when AC input voltage collapses and battery voltage goes low (Buffering Mode)	High[2)]
Battery Low	This signal turns active Low when battery voltage is lower than Deep Discharge Protection voltage +1.0V, or when no battery is connected.	Low[1)]
	This signal is active High when battery voltage is higher than Deep Discharge Protection voltage +1.0V (Normal and Buffering Mode)	High[2)]

1) Low: 0.5V with max 30mA
2) High: External applied voltage, 48V max

Monitoring Signals Wiring Diagram



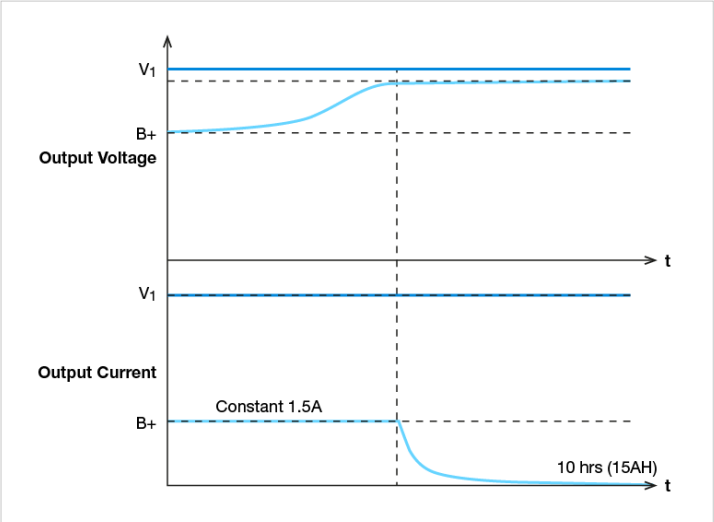
PMU Status	Monitoring Signal status			LED Indicator	
	AC OK	DC OK	Battery Low	Green	Red
PMU OFF	High	High	Low	OFF	OFF
Battery Reversed[1)]	High	High	Low	OFF	ON
PMU ON[2)] with Battery	Low	Low	High	ON	OFF
Battery Charging					
Battery Fully Charged					
Battery Discharging (Buffering Mode)	High	Low	High	ON	OFF
Battery Discharging (Low Battery detected)	High	High	Low	OFF	OFF
Output Shutdown	High	High	Low	OFF	OFF

1) If the RED LED is on, this indicates a failure in the installation. In this case, do not turn on power supply (for 27V only) while the battery is connected. **POWER SUPPLY WILL BE DAMAGED!**
2) "PMU ON" means that PMU is operating from AC input voltage

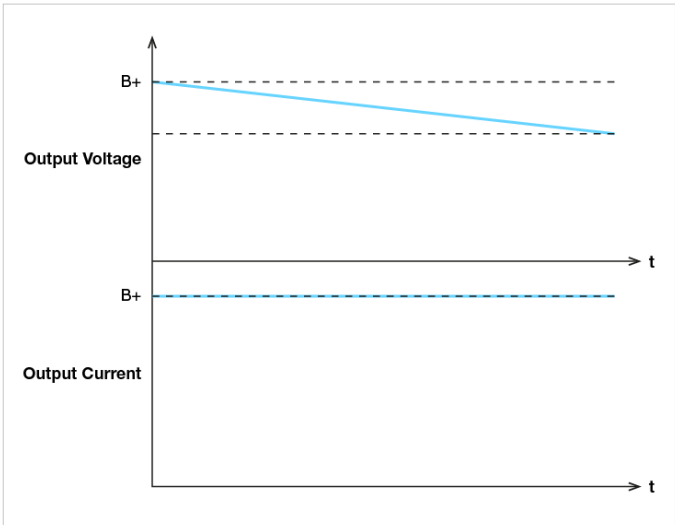
PMU Panel Mount Power Supply with Integrated DC-UPS

PMU-155W Series / PMU-☐V155W☐☐A

Normal Mode (Power supply (V1) and Battery charging (B+))



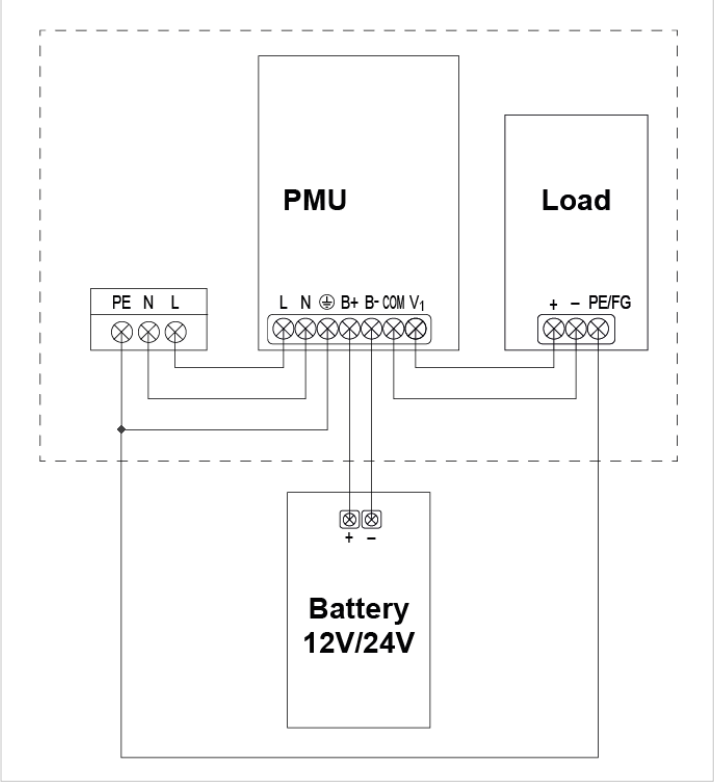
Buffering Mode (Battery discharging (B+))



The maximum combined output power from V1 and B+ is 151W at 180-264Vac input but the output power is reduced to 136W at 90-132Vac input.
For example;
151W; V1: 27.6V/4A (110.4W), B+: 27.1V/1.5A (40.6) or V1: 27.6V/5.5A (151W), B+: 27.1V/0A (0W).
136W; V1: 27.6V/3.45A (95.2W), B+: 27.1V/1.5A (40.6) or V1: 27.6V/4.9A (136W), B+: 27.1V/0A (0W).

Typical Application Notes

Fig. 5 Provide backup power during AC source interruption or failure

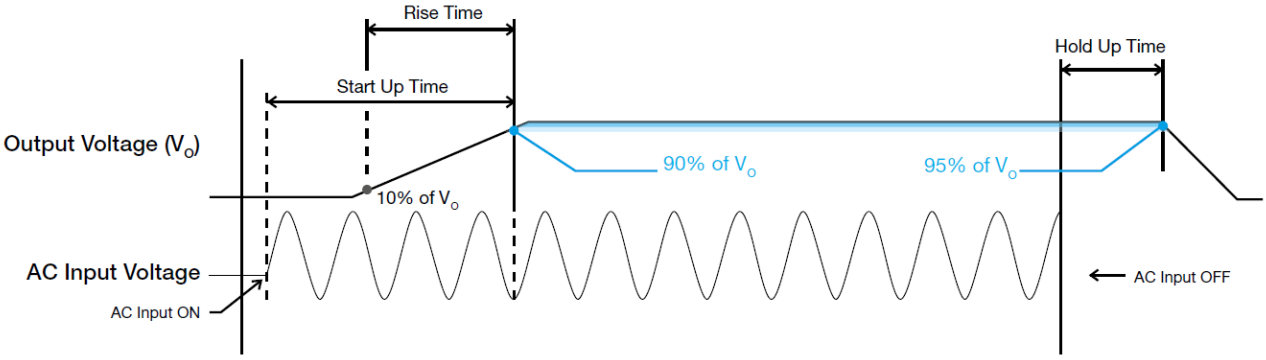


PMU can use as standalone as well and please refer output power to Normal Mode on page 2.

PMU Panel Mount Power Supply with Integrated DC-UPS

PMU-155W Series / PMU-☐V155W☐☐A

■ **Graph illustrating the Start-up Time, Rise Time, and Hold-up Time**



Start-up Time

The time required for the output voltage to reach 90% of its final steady state set value, after the input voltage is applied.

Rise Time

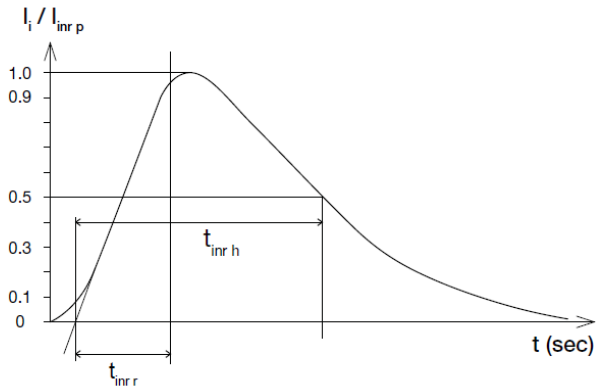
The time required for the output voltage to change from 10% to 90% of its final steady state set value.

Hold-up Time

Time between the collapse of the AC input voltage, and the output falling to 95% of its steady state set value.

Inrush Current

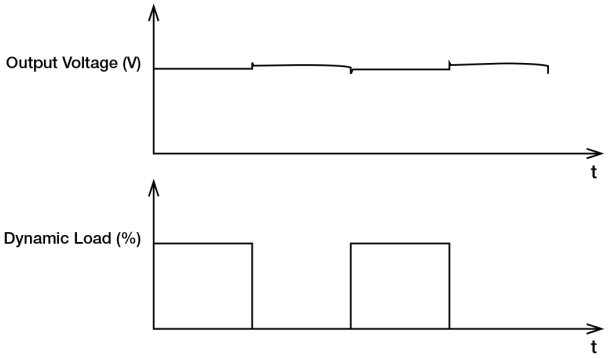
Inrush current is the peak, instantaneous, input current measured and, occurs when the input voltage is first applied. For AC input voltages, the maximum peak value of inrush current will occur during the first half cycle of the applied AC voltage. This peak value decreases exponentially during subsequent cycles of AC voltage.



Dynamic Response

The power supply output voltage will remain within ±5% of its steady state value, when subjected to a dynamic load from 10% to 100% of its rated current.

■ **50% duty cycle / 5Hz to 1KHz**



PMU Panel Mount Power Supply with Integrated DC-UPS

PMU-155W Series / PMU-☐V155W☐☐A

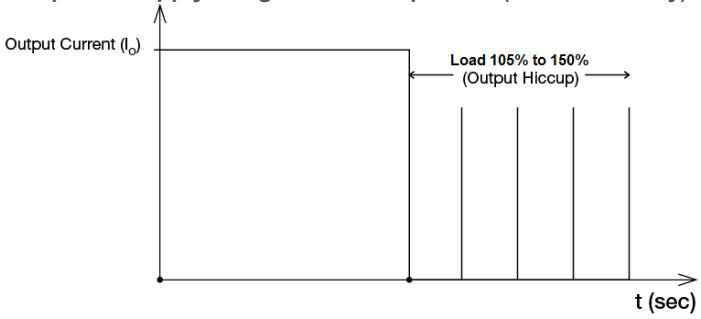
Overload & Overcurrent Protections (Auto-Recovery and Latch Mode)

The behavior of the power supply's Overload (OLP) and Overcurrent (OCP) Protections depend on whether the unit is operating in the Normal Mode, or the Buffering Mode.

Normal Mode (Operation from AC input Voltage)

In the event of an output current within 105% to 150% of I_O (Max load) the V_O will start to droop. Once the power supply has reached its maximum power limit, the protection is activated; and, the power supply will go into "Hiccup mode" (Auto-Recovery). The power supply will recover once the fault condition of the OLP or OCP is removed and I_O is back within the specified range.

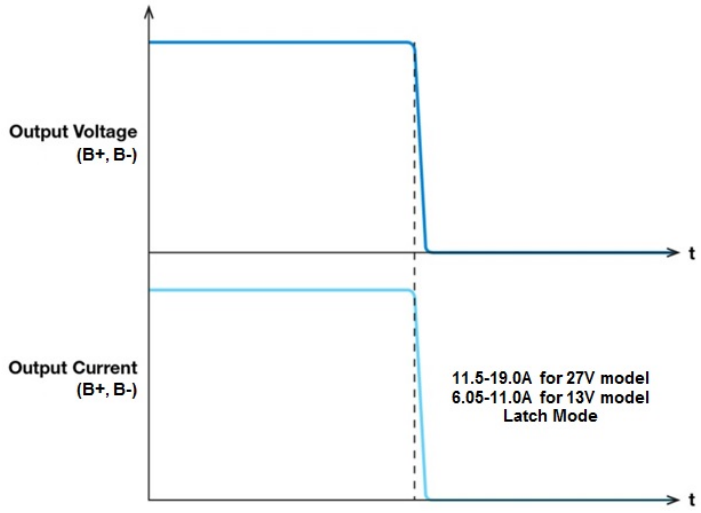
The power supply will go into Hiccup mode (Auto-Recovery).



Buffering Mode (Operation from Battery)

When the output current exceeds the maximum specified output value, the unit will latch. The power supply can then be re-started by removing the fault; and, re-application of input AC voltage.

The power supply will Latch in Buffering Mode.



Short Circuit Protection (Auto-Recovery)

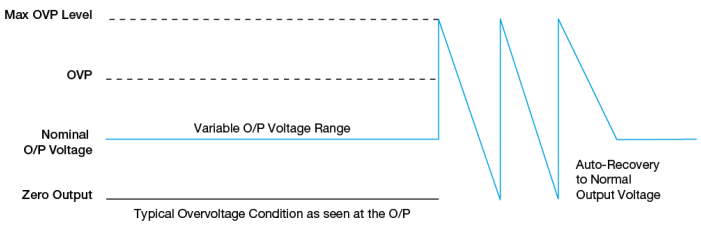
The power supply's output OLP/OCP function also provides protection against short circuits. When a short circuit is applied, the output current will operate as shown in the illustration in the OLP/OCP section on this page.

Normal Mode: The power supply will go into Hiccup mode (Auto-Recovery).

Buffering Mode: The power supply will Latch.

Overvoltage Protection (Auto-Recovery)

The power supply's overvoltage circuit will be activated when its internal feedback circuit fails. The output voltage shall not exceed its specifications defined on Page 5 under "Protections".



Over Temperature Protection (Latch Mode)

As described in load de-rating section, the power supply also has Over Temperature Protection (OTP). In the event of a higher operating temperature at 100% load; or, when the operating temperature is beyond what is recommended in the de-rating graph, the OTP circuit will be activated. When activated, power supply will latch off, until the surrounding air temperature drops to its normal operating temperature or the load is reduced as recommended in the de-rating graph. Removal/re-application of input AC voltage will then be required in order to restart.

Troubleshooting

PMU-☐V155W☐BA and PMU-☐V155W☐CA

Problem	Possible Cause	Suggestion
Red LED is ON after battery is connected	Polarity of connections from battery to the unit is incorrect. Do not turn on power supply (for 27V only) while the battery is connected. **POWER SUPPLY WILL BE DAMAGED!**	Check battery polarity connection, and make corrections.
PMU does not operate in normal mode after AC is applied	Input wiring is open or input voltage to the supply is not available.	Check wiring and voltage of input supply.
	Internal fuse is opened.	Contact your local Delta sales support group.
PMU does not operate in Buffering mode after AC is collapsed	Battery wiring is not connected or opened.	Check battery wiring and compare with Typical Application Notes in this PMU datasheet. Make corrections as needed.
	Battery did not have enough time to be charged and it is still below the continuous operating voltage range.	Check battery voltage and compare with minimum required battery voltage provided in this PMU datasheet.
PMU does not charge and discharge battery	Battery is damaged.	Check battery and replace as needed.

PMU-☐V155W☐CA

Problem	Possible Cause	Suggestion
Battery Low signal status is Low	**Normal Mode:** Battery voltage is lower than Deep Discharge Protection voltage of +1.0V specified on this data sheet.	- Determine if the battery is in good condition. If yes, the signal will change status to High after battery is charged for a while. - If there is a problem with the battery, the signal will remain Low status. Please check battery voltage at B+ and B- power supply terminals according to condition of input power and load are disconnected and refer to battery minimum voltage at page 3.
	Buffering Mode: Battery is discharged and its voltage is lower than Deep Discharge Protection voltage of +1.0V specified on this data sheet.	Connect AC input power to the input terminals. This will charge the battery, and will cause the signal to return to a High state after sufficient charging time has elapsed.
	Battery is not connected.	Check connections to the battery.
AC OK signal status is High	Input AC voltage is not available.	Check wiring of AC input voltage to the power supply.
	Power supply is operating in buffering mode.	
DC OK signal status is High	**Normal Mode:** a) Input AC voltage is not available. b) PMU is damaged.	a) Check wiring of AC input voltage to the power supply. b) Contact your local sales support group.
	Buffering Mode: Battery is discharged and its voltage is lower than Deep Discharge Protection voltage of +1.0V specified on this data sheet.	Battery will be charging again after input power is available.

Others

Delta RoHS Compliant

Restriction of the usage of hazardous substances

The European directive 2011/65/EU limits the maximum impurity level of homogeneous materials such as lead, mercury, cadmium, chrome, polybrominated flame retardants PBB and PBDE for the use in electrical and electronic equipment. RoHS is the abbreviation for “Restriction of the use of certain hazardous substances in electrical and electronic equipment”.

This product conforms to this standard.

PFC – Norm EN 61000-3-2

Line Current Harmonic content

Typically, the input current waveform is not sinusoidal due to the periodic peak charging of the input capacitor. In industrial environments, compliance with EN 61000-3-2 is only necessary under special conditions. Complying to this standard can have some technical drawbacks, such as lower efficiency; and, can also result in higher product cost. Frequently, the user does not profit from compliance to this standard; therefore, it is important to know whether it is mandatory to meet this standard for a specific application.

Attention

Delta provides all information in the datasheets on an “AS IS” basis and does not offer any kind of warranty through the information for using the product. In the event of any discrepancy between the information in the catalog and datasheets, the datasheets shall prevail (please refer to www.DeltaPSU.com for the latest datasheets information). Delta shall have no liability of indemnification for any claim or action arising from any error for the provided information in the datasheets. Customer shall take its responsibility for evaluation of using the product before placing an order with Delta.

Delta reserves the right to make changes to the information described in the datasheets without notice.

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

Delta Electronics:

PMU-27V155WCCA PMU-13V155WCBA PMU-27V155WCBA PMU-13V155WCCA